DOCUMENT RESUME

ED 221 969 EC 143 300

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TITLE Teaching Thinking Skills to Hearing-Impaired Adolescents.
PUB DATE 27 Feb 82
NOTE 13p.; Session Proceedings from Washington Regional Conference of Educators of the Hearing-Impaired (Washington, DC, February 27, 1982).

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Adolescents; *Cognitive Development; *Hearing Impairments; *Intervention; *Problem Solving; Secondary Education
IDENTIFIERS Instrumental Enrichment

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TEACHING THINKING SKILLS TO HEARING-IMPAIRED ADOLESCENTS

Session Proceedings from
Washington Regional Conference of
Educators of the Hearing-Impaired
Kendall Demonstration Elementary School
February 27, 1982

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Abstract

A special instructional intervention program to develop cognitive skills in hearing-impaired adolescent students was analyzed and described, based on a special pilot project at the Model Secondary School for the Deaf (MSSD) at Gallaudet College. The program, Instrumental Enrichment, uses special pencil-and-paper exercises to focus on specific strategies related to problem-solving, such as: projection of virtual relationships, orientation in space, comparison and contrast, analytic perception, and others. A theoretical overview of the instructional program was presented, followed with examples of specific student activities. Adaptations of the program for the special needs of the hearing-impaired learner were also presented; evaluation data based on systematic observation were also presented in relation to positive outcomes in the thinking style of the experimental pilot group of students. Results indicate important improvement in problem-solving strategies across subject matter areas, and generalized conclusions were made about applicability of the intervention program to hearing-impaired adolescent groups in a variety of educational settings.

Rationale

The need for systematic instruction of students in cognitive strategies is clear in view of national test results indicating a decline in problem-solving skills. In addition, with the nation in an apparent "back-to-basics" fad in school curriculum which tends to focus on lower-level thinking skills, direct action by teachers is essential immediately in order to maintain a balance in the curriculum. However, the availability of specific programs designed to meet this need in the school setting has been indeed limited. More specifically, teachers who work with hearing-impaired adolescents frequently express deep concern and frustration about some of their students' serious deficiency in problem-solving skills, as evidenced in both classroom and written work. The concern often relates to difficulty with manipulating more than one variable, conceptualizing what a textbook or journal author is saying, forming conclusions, dealing with hypothetical data, and spatial reasoning.

Yet, research with the hearing-impaired has documented that no basic malfunctions are present in the cognitive abilities of that population and that any inferiorities in cognitive performance may be able to be accounted for by experiential and linguistic deficits, and communication handicaps (Levine, 1976, p.28). To compound the problem, many teachers themselves in both hearing-impaired and hearing classrooms have had no formal training in operational thinking either as part of their own training or as a subject for teaching (Passow, 1980, p.399).

During the past two years, however, a specially developed program entitled Instrumental Enrichment (1978), has become available in the United

States, developed by the Israeli Piagetian scholar, Reuven Feuerstein (1980). This three-year classroom intervention program for adolescents and adults uses content-free paper-and-pencil exercises to correct deficient cognitive functions and provide the prerequisites for learning and problem-solving. Fourteen specific skills are enhanced through the program including: analytic perception, orientation in space, comparison, social relationships, syllogistic thinking, categorization, and numerical progression. A program such as this which can stress both concept formation and the application of concepts has enormous potential benefit for hearing-impaired adolescents in educational settings.

Research indicates "normal" performance by the hearing-impaired on some cognitive tasks and not on others; we also see controversy among the researchers as well as a number of unanswered questions for further research. It is generally accepted that the hearing-impaired child will have difficulty with English-language related tasks if that child's native language is not English but American Sign Language. However, Furth makes a useful point in regard to the whole area of cognitive development among the hearing-impaired when he hypothesizes that deficient cognitive areas may be due not to any language deficiency, but to limited social environment (Furth, 1964, p. 154). He later elaborates that the deaf and the culturally disadvantaged hearing are "remarkably similar" in overall intellectual development due to a lack of stimulus for thinking activities in both home and school (Furth, 1973, p. 47). The latter statement would apply to hearing-impaired children of hearing parents because of the frequent lack of regular manual communication by hearing parents with their hearing-impaired children; the above remark about

school is an indictment of educational programs which have failed to stimulate and maintain high expectations for hearing-impaired children in the thinking skills domain.

The relationship between language and cognition is both essential and complex; this presentation focuses on an intervention program which makes regular use of language as a medium. We know, for example, that using language enables us to restruct mental schemata, perceive reality in new ways, and to redesign the strategies employed to solve problems (Klein, 1981, p. 449). A major body of research during the past fifty years indicates that language in social interaction is critical to effective cognitive development (Vygotsky, 1962, 1978; Wertsch, 1978). The work of Halliday (1973) and Tough (1977) has reinforced Vygotsky's work and given new insights on the degree of linguistic use by children in attacking cognitive problems. Thus, it is highly appropriate that an intervention program for hearing-impaired children in the area of cognitive development recognize and use language in a systematic manner, since as previously noted, the linguistic deficits of hearing-impaired children are considered to be partly responsible for some of their difficulties in cognition.

If we accept the fact that certain specific cognitive deficiencies do exist for the hearing-impaired but that no evidence suggests less than the normal range of intellectual <u>potential</u> among the hearing-impaired as a general group, then it is apparent that a specific program of activity in an educational setting may have promise for improvement of these skills. In addition, a program which was originally developed to improve the performance of disadvantaged-hearing children who had some of the same deprivation of thinking

skill opportunities as the hearing-impaired, may well be specialically the type of program which is adaptable for this special purpose.

Program Description

The need for systematic intervention programs to address this problem has also been recognized by others. Project LIFE, funded through a grant from the Bureau for the Education of the Handicapped of the U.S. Office of Education, is a mediated instructional program aimed at significantly reducing the language and reading problems of hearing-impaired children. This program consists of several components, one of which focuses on "perceptual thinking" and is based on the theoretical model of the Structure of Intellect developed by J. P. Guilford and later refined for application to education by Mary Meeker. The program uses a series of programmed filmstrips and has been used widely in classes for hearing-impaired children with reported positive outcomes in language development.

Considerable interest is now being expressed in improving thinking in the classroom setting. A recent issue of the Volta Review carries two articles on this topic, including one in which the writer calls for classroom teachers of the hearing-impaired to develop their own programs and explains some guidelines for so doing (Cole, 1980, p. 344). Furth himself, after drawing conclusions from research on the need of deaf children for practice in thinking and reasoning, followed through with a book on "thinking games" based on Piaget tasks and theory (Furth & Wachs, 1974). Other existing school programs such as the Peninsula Oral School approach have focussed on sequences of cognitive strategies or tasks for the hearing-impaired, leading through concept formation, interpretation, inference,

generalization, and application of principles (Levine, 1976, p.54). With the need clearly indicated in the above review of the literature, and the interest as expressed in such forms as the above-mentioned articles, an already-formulated program which is well tested would seem most timely and would not necessitate teachers having to develop their "own" products.

Such a program is Instrumental Enrichment (IE), developed originally in Israel by Reuven Feurstein, a student of Piaget, in response to the need for mediated learning experiences (MLE) for culturally disadvantaged groups emigrating to Israel. Feuerstein observed that a disproportionately large number of adolescents among certain immigrant groups (for example, Moroccan Jews) were being classified by the Israeli school system as "mentally retarded." In response to this observation, he developed the Learning Potential Assessment Device (LPAD) as a means of precisely identifying the potential of these children; this individualized instrument assesses the individual in great depth according to a number of specific cognitive skills.

As a result of that assessment, he realized the need for a specific intervention program which would provide mediated experience where it was lacking in these students, and thus he developed the program known as Instrumental Enrichment (IE), a three-year supplement to the regular curriculum in which students focus on paper-and-pencil exercises of increasing complexity designed to develop and enhance fourteen specific cognitive skills at the representational level of thinking.

Both Project LIFE and IE focus on cognitive skill development, require mediation, emphasize hierarchical levels of complexity, and teach skills

which underlie other parts of the school curriculum.

Unlike Project LIFE which is intended for use especially although not exclusively with younger students, however, Instrumental Enrichment focuses exclusively on the student of early adolescent years and older because all tasks require mental opeations at the representational level of thinking. Several other differences are worth noting. The major thrust of Project LIFE is on the development of language skills, while IE is aimed at the development of cognitive skills without any intent to enhance any one specific learning skill, but rather to stress the generalizability of these cognitive skills to all areas of learning and to life. Project LIFE does not require symbolic responses in students, while IE does. Project LIFE, therefore, has contributed a major instructional strategy to the field of teaching the hearing-impaired; IE holds promise of complementing those contributions by focusing on the adolescent with the emphases noted above.

The special intervention program, Instrumental Enrichment, provides an excellent mechanism in relation to the results of earlier studies for the following reasons:

1. It uses a "metacognition" approach in that students are given repeated opportunities to reflect on their own thinking processes.

2. Unlike those cognitive training programs focussing on impulsivity as a personality characteristic, Feuerstein's work assumes that impulsivity is a characteristic of the "retarded performer" due to his lack of adequate mediated learning experience; thus, IE assumes that impulsivity may be reduced or eliminated but for a different reason than these other programs.

3. IE definitely develops the prerequisites for learning and does not assume that those prerequisites already exist in the learner as has happened in several of the less-than-completely-successful intervention programs mentioned in the review of the literature.

4. IE recognizes the age-specificity of developing generalizable cognitive strategies: Feuerstein is unambiguous about the IE program being appropriate only for learners at the representational level of thinking and beyond.

5. IE does not assume that generalization will automatically occur; rather, a critical element in the daily instructional sequence for IE is the "bridging" exercises in which the teacher overtly and actively promotes transfer of skills by the student to both real-life and curricular situations.

Thus, because of its avoidance of the pitsfalls of earlier programs in the above respects, the IE program represents a highly logical intervention step in the history of cognitive intervention programs.

Session Activities:

Various participatory activities and a classroom videotape were used to illustrate the many problem-solving strategies which are taught by the program, including the methodology of making "bridges" between these skills in their content-free form and subject-matter applications in the context of the school curriculum.

Research Project:

A special two-year pilot project, being carried out at the Model Secondary School for the Deaf at Gallaudet College, was described. A control group of twenty-four students and an experimental group of twelve students are being studied using various measures of cognitive functioning. Student reading comprehension and mathematical computation and problem-solving skills are being measured with written tests; student self-concept change as problem-solvers is being studied through projective techniques.

In addition, strategies which students use in approaching new problems are being studied through videotaped individual interviews, analyzed by independent observers. Finally, teachers working with experimental students in subject areas in which Instrumental Enrichment is not deliberately taught, are being asked to evaluate students according to a systematic checklist of behaviors relating to problem-solving skills. Results are expected to be ready for dissemination in the spring of 1983.

Program Adaptations for the Hearing-Impaired:

In working with this special cognitive intervention program, a few adaptations have been found to be important in relating the program to hearing-impaired adolescents. Among them, the following have been reported by the pilot teachers:

1. The natural use of American Sign Language by students in the classroom makes it imperative that teachers ask students to restate their responses in Manual English, in order to check on their understanding of the particular concept or category which is being discussed during an Instrumental Enrichment class.

2. Additional time is needed for the translation of English terminology to A.S.L., as well as its appropriate counterparts in new vocabulary terms and reinforcement of their usage in sign language. Since students are encouraged to express concepts and responses freely in the language of their choice (A.S.L. or English), it is usually necessary to present them with the appropriate written form in English.

3. Students require continual reinforcement and illustration of the ways in which "bridges" can be made between intervention exercises and subject-matter applications.

Other than the above adaptations, however, the Instrumental Enrichment program appears to be teachable within the same sequence and general time-frame as for hearing adolescents; this finding is significant in planning for future adoptions of the program for hearing-impaired populations.

Observed Results:

Although the pilot project is of two year's duration, and this report comes slightly later than the middle of Year I, it is possible to draw the following conclusions about Experimental Group students based on systematic observation by both teachers and administrators:

1. Students approach problem-solving situations in the curriculum in general more systematically and with less impulsivity.
2. Students have improved in their ability to analyze the component parts of a problem.
3. Students appear to have improved in their understanding of the reasons behind required assignments in English and Mathematics.
4. Significant growth in vocabulary usage has been observed in sign language; no evidence of growth in written application of these words has been observed as yet.
5. Significantly higher student motivation in problem-solving tasks has been noted.
6. Students are now working with peers in problem-solving tasks with significantly less "black-and-white" thinking or simplistic criticism of peers' work as either right or wrong; rather, they appear to be better able to analyze individual components of peers' work as to which elements are right and wrong and why.
7. Peer cooperation and positive approach to criticism by students have been clearly noted.

Additional data based on paper-and-pencil measures and analyses of individual interviews are anticipated, but are not available at this time.

Conclusion:

All persons who work with hearing-impaired adolescents are invited to communicate with the M.S.S.D. Project for further information about the program and methods for local adoption. Contact person would be: Dr. David Martin, Department of Education, Gallaudet College, Washington, DC, 20002; 202-651-5400, telephone or T.D.D.

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